

## Claims

- [c1] What is claimed is:
- 1.An acoustic signal input device comprising:
- an input for inputting acoustic signals;
- a plurality of bandpass filters each for passing acoustic signals with frequencies within a predetermined frequency range, and transforming the acoustic signals into electrical signals and amplifying the electrical signals; and
- a plurality of switches each connected to a corresponding bandpass filter for controlling on and off of the bandpass filter;
- wherein the switches are capable of being selectively turned on so as to amplify transformed electrical signals within different frequency ranges at different amplifications.
- [c2] 2.The acoustic signal input device of claim 1 wherein each of the bandpass filters comprises:
- two signal transformation units for transforming acoustic signals into electrical signals, the signal transformation units having different resonant frequencies for filtering the electrical signals; and
- a differential amplifier electrically connected to the signal transformation units for amplifying a difference between the electrical signals transmitted from the signal transformation units.
- [c3] 3.The acoustic signal input device of claim 1 wherein each of the bandpass filters is an amplitude-tunable filter capable of changing amplification of electrical signals.
- [c4] 4.The acoustic signal input device of claim 1 being connected to an amplifier for further amplifying the electrical signals transmitted from the acoustic signal input device.
- [c5] 5.The acoustic signal input device of claim 1 wherein the plurality of bandpass filters are formed by performing a micromachining fabrication process.
- [c6] 6.The acoustic signal input device of claim 1 being a microphone.
- [c7] 7.An acoustic signal input device comprising:

an input for inputting acoustic signals;  
a plurality of bandpass filters each for passing acoustic signals with frequencies within a predetermined frequency range and transforming the acoustic signals into electrical signals;  
a plurality of amplification circuits connected to the bandpass filters for amplifying electrical signals transmitted from the bandpass filters; and  
a plurality of switches each connected to a corresponding amplification circuit for controlling on and off of the amplification circuit;  
wherein the switches are capable of being controlled to selectively turn on amplification circuits so as to amplify electrical signals within different frequency ranges at different amplifications.

- [c8] 8.The acoustic signal input device of claim 7 wherein each of the bandpass filters comprises:  
two signal transformation units for transforming acoustic signals into electrical signals, the signal transformation units having different resonant frequencies for filtering the electrical signals; and  
a differential amplifier electrically connected to the signal transformation units for amplifying a difference between the electrical signals transmitted from the signal transformation units.
- [c9] 9.The acoustic signal input device of claim 7 being connected to an amplifier for further amplifying the electrical signals transmitted from the acoustic signal input device.
- [c10] 10.The acoustic signal input device of claim 9 wherein the amplifier is connected to an acoustic signal output device for transforming the electrical signals transmitted from the amplifier into acoustic signals and outputting the acoustic signals.
- [c11] 11.The acoustic signal input device of claim 7 wherein the plurality of bandpass filters are formed by performing a micromachining fabrication process.
- [c12] 12.The acoustic signal input device of claim 7 being a microphone.
- [c13] 13.An acoustic signal output device electrically connected to a signal source,

the signal source comprising a plurality of channels for transmitting electrical signals within different frequency ranges, the acoustic signal output device comprising:

a plurality of amplifying elements connected to different channels of the signal source for amplifying electrical signals at different amplifications and transforming amplified electrical signals into acoustic signals.

[c14] 14.The acoustic signal output device of claim 13 wherein each of the amplifying elements has a greatest amplification for electrical signals within a frequency range corresponding to a frequency range of a channel that is connected to the amplifying element.

[c15] 15.The acoustic signal output device of claim 13 further comprising:  
a plurality of switches each connected to a corresponding amplifying element for controlling on and off of the amplifying element;  
wherein the switches are capable of being controlled to selectively turn on amplifying elements so as to amplify electrical signals within different frequency ranges at different amplifications.

[c16] 16.The acoustic signal output device of claim 13 wherein the signal source is an amplifier, the amplifier amplifying the electrical signals before the electrical signals are transmitted to the acoustic signal output device.

[c17] 17.The acoustic signal output device of claim 13 wherein the signal source is connected to an acoustic signal input device for receiving electrical signals from the acoustic signal input device.

[c18] 18.The acoustic signal output device of claim 13 being a speaker.

[c19] 19.The acoustic signal output device of claim 13 wherein each of the amplifying elements comprises a signal transformation unit for transforming amplified electrical signals into acoustic signals.

[c20] 20.The acoustic signal output device of claim 13 being formed by performing a micromachining fabrication process.